

Microorganism eating contaminants

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ASU researcher Bruce Rittmann has found an environmentally friendly way to mitigate the human health threat from perchlorate drinking water contamination. Perchlorate is a component of solid rocket fuel.

The U.S. Environmental Protection Agency has grappled with the goal of lowering the perchlorate risk, but current solutions are difficult or very expensive.

Because perchlorate cannot be removed by conventional water treatment processes, Rittmann, director of the Center for Environmental Biotechnology at the Biodesign Institute at ASU, has developed a new technology that uses bacteria to render perchlorate-contaminated water harmless.

“We are really just harnessing the natural capabilities of microorganisms,” says Rittmann, who also is a civil and environmental engineering professor. “What we consider contaminants, they consider food.”

The system, called a membrane biofilm reactor (MBfR), uses hydrogen gas as an electron donor to reduce the perchlorate ions to harmless chloride ions (like those found in everyday table salt) and water.

Rittmann, along with collaborators Jinwook Chung, Reid Bowman (Applied Process Technology), and William Wright (California State University, Fresno), report success using the MBfR to treat four contaminated ground waters, each containing perchlorate and nitrate, but

also different combinations of chlorate, arsenate and dibromochloropropane (DBCP).

In each case, the MBfR simultaneously reduced nitrate, perchlorate, chlorate, arsenate, and DBCP in the contaminated groundwater – achieving the goal of reducing perchlorate and several other oxidized contaminants in parallel.

ASU researchers presented their findings at the 230th national meeting of the American Chemical Society.

Source: Arizona State University

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